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UNIONIDÆ OF THE PANUCO RIVER SYSTEM, MEXICO.

BY HENRY A. PILSBRY.

The extensive river system emptying by the Panuco River into the Gulf of Mexico at Tampico has a rich mollusk fauna, in which the *Melaniidæ* and *Unionidæ* are particularly well developed. A few of the mussels were collected by Dr. Blanding many years ago and described by Dr. Isaac Lea. Many more were taken by Mr. A. A. Hinkley in January and February of the present year. All of the species known from the Panuco drainage are included in the following list. The localities mentioned may be found on the map, p. 520.

Only four Panuco species are now known to extend southward into the rivers of the neighborhood of Vera Cruz. There is more affinity with the fauna of the Rio Salado.

The generic relationships of eastern Mexican *Unionidæ* are very uncertain, since Simpson, in his great systematic work, knew the soft parts of very few Mexican forms, and there are no definite generic characters in the shells alone distinguishing the genera *Unio*, *Nephronaias* and *Lampsilis*. Some species which have been referred to the two former genera seem to me to belong to *Lampsilis*. Under these circumstances, it will be understood that the generic references herein are made with reserve, and subject to revision by those who may study these mussels in the flesh.

Quadrula nickliniana (Lea).

Unio n. Lea, Obs., I, 140; III, 72.

Moctezuma River (Dr. Blanding). This large and handsome plicate species was not found by Mr. Hinkley.

Quadrula semigranosa v. d. Busch.

Unio semigranosus v. d. Busch, in Philippi, Abbild., I, p. 19, pl. 1, figs. 1–3. Martens, Biologia, p. 493, pl. 30, figs. 1–4.

Rio Panuco at Tampico, type loc. It has not been found by Mr. Hinkley.

My record of this species from Rio Tuliga in Tabasco, copied into the *Biologia* by Prof. von Martens, was erroneous, the specimen from that place being *U. corium* Sowb. and not *semigranosus*. This leaves only the Panuco locality on record for the species, though related forms are known from southern Mexico. It is an alien in northeastern Mexico.

Lampsilis aztecorum (Phil.).

Philippi, Abbild., III, p. 27, pl. 6, fig. 2. Martens, Biologia, p. 502, pl. 36, figs. 2–4*a*; pl. 37, figs. 3, 3*a*,*b*.

Zimapan, on the Rio San Juan, a southern confluent of the Panuco (Schiede). Not taken by Mr. Hinkley.

Lampsilis strebeli (Lea).

Obs., XII, p. 78, pl. 51, fig. 131; Martens, Biologia, p. 503, pl. 37, figs. 1, 2 (as a variety of *aztecorum*). *Nephronaias medellinus* Simpson, Synopsis, p. 592, footnote 2.

Valles River, two miles above Mecos, at the head of the rapids. Taken from crevices in the bed of the stream, where the water was deep and the current so strong that it was difficult to hold one's position.

The shells in this place were so badly eroded that a third were discarded.

This species was described from the State of Vera Cruz. It has been united with *medellinus* by Mr. Simpson, and with *aztecorum* by von Martens, but I think it specifically distinct.

Lampsilis fimbriata Frierson.

Nautilus, XXI, p. 86, pl. 12, figs. 1–3, Dec., 1907. *L. salinasensis* Simpson, in Dall, Proc. U. S. Nat. Mus., 1908, p. 101, pl. 30, fig. 3.

Valles River at Valles, at the ranch of Mr. Willis, between Valles and Pujal, and two miles above Mecos, where it occurs with *L. strebeli.* "At Valles the water was very shallow, and nearly the whole bed of the stream could be waded. The shells were found between and under rocks in mid-stream, and a few were taken from a muddy bank across the river from the town." This fine Lampsilis is related to *L. strebeli* on the one side, to *L. discus* on the other.

Lampsilis discus (Lea).

Unio discus Lea, Obs., II, p. 74; III, p. 72. Von Martens, Biologia, p. 509, with var. *connectens* and *panucoensis*, p. 510.
Unio lapidosus Villa in Kobelt.

Moctezuma River. "Just below the ford the river is divided by a large island. The stream on the right has a strong current; that on the left is checked to some extent by a rock outcrop at the lower end of the island. In this part of the stream quite a bed of this species was found." (A. A. H.)

The type locality is the Rio Moctezuma. The varieties described by Prof. von Martens cannot be sustained. They occur together and fully intergrade. It is a magnificent species, one of the largest in *Lampsilis.* The nacre may be white, salmon or purple.

Lampsilis tampicoensis (Lea).

Unio tampicoensis Lea, Obs., II, p. 24. Von Martens, Biologia, p. 511, pl. 33, fig. 1.

Valles River at Mr. Willis' ranch, about halfway between Valles and Pujal.

Lampsilis moctezumensis n. sp. Pl. XXV, figs. 1, 2, 3, 4.

The shell is oblong, the dorsal and ventral margins both arched, the former a little more so; altitude decidedly more than half the length, diameter more than one-third the length; moderately strong but not thick. The beaks are small and low, near the anterior fourth of the length. In young shells they show one or two low, short undulations, being nearly smooth. Color yellowish brown. Adult shells hardly showing rays, even by transmitted light, but the young have narrow green rays posteriorly, on a yellow ground, marked with dark concentric streaks. Both ends are rounded. Sculpture of growth-wrinkles only, weak on the middle of the valve, but rather emphatic anteriorly. The interior is white, the nacre thinner and iridescent posteriorly. The pseudocardinal teeth are moderately stout, blunt and nearly smooth. In the left valve the posterior cardinal is larger than the anterior. In the right valve the single cardinal is small. The lateral teeth are short and widely separated from the cardinals. The cavity of the beaks are rather deep.

Length 68, alt. 38½, diam. 24 mm.

Moctezuma River, State of San Luis Potosi. Very few specimens were found.

This species has some resemblance to *spatulatus* (Lea). It differs from the related species by wanting corrugation on the posterior slope.

Lampsilis iridella Pilsbry and Frierson.

Nautilus, XXI, pl. 12, figs. 4, 5 (Dec, 1907); XXII, p. 81 (Dec., 1908).

Very abundant in the Valles River at Valles and Mr. Willis' ranch. Also taken in the Casas Viejas River, the Coy River, and Tampamolone Creek.

Most specimens from Valles are larger than the types, brownish-yellow or olive-yellow with rays only on the posterior half, when adult, or sometimes rays are entirely wanting. An adult shell measures, length 61, alt. 31, diam. 19.5 mm.

Lampsilis semirasa n. sp. Pl. XXVI, figs. 7, 8, 9.

The shell is oblong-reniform, the ventral margin being a little concave in the middle or straight, the upper margin strongly arched; the posterior end is wider in female shells, scarcely so in males. The altitude is contained about 1¾ times in length, diameter about 3 times in the length. The surface is smoothish except for growth-lines which are strongest near the lower margin and anterior end. Color various shades of brown, with rather indistinct darker or greenish rays, chiefly on the posterior half. The beaks are low, at the anterior fifth of the length. When perfect they have double-looped concentric sculpture. Valves thin, lined with nacre which is whitish in the cavity and anteriorly, but pink and very iridescent posteriorly (sometimes suffused with pink throughout, darker and purplish below the pallial line, or sometimes silvery white throughout). Pseudocardinal teeth compressed, rather small; lateral teeth very short, about one-third the shell's length. Ligament short.

Length 47, alt. 26½, diam. 16½ mm.
" 47, " 26, " 15 "

Ganina River three miles southwest of San Dieguito, in mud and gravel in clear water about knee-deep, where there was no current. Also in the Valles River two miles above Mecos.

Some specimens of the type lot are larger, length 55, alt. 28, diam. 16 mm. There is also some variation in the teeth, which may be more or less stout.

In the Valles River at Mecos the shells are rather small and not incrusted; nacre white, iridescent posteriorly, but not suffused there with pink or purple. Some of the half-grown specimens are quite fully rayed.

Two miles above Mecos in the Valles River there are large shells with but little incrustation, and rather dull, opaque, white nacre, with but little iridescence. Two measure:

Length 58, alt. 34, diam. 19 mm.
" 56, " 28½, " 19½ "

L. semirasa differs from *L. signata* and *L. undivaga* by lacking corrugation on the convexity of the valves and on the posterior-dorsal slope. It apparently lives with the shell nearly half buried, somewhat more than the posterior half projecting, and in most localities covered with a hard calcareous coat, as in pl. XXVI, fig. 9. Fig. 7 represents a cleaned specimen.

Lampsilis popei (Lea).

> *Unio popei* Lea, Obs., VIII, p. 54 (Devils River, Texas, and Rio Salado, Nuevo Leon, Mexico).

Valles River at Valles, Willis' ranch, and two miles above Mecos. Abundant. Tampamolon Creek, one specimen. The shells have fine purple nacre, coppery and iridescent posteriorly. I have compared them with the types of *popei* in U. S. National Museum.

Lampsilis signata n. sp. Pl. XXV, figs. 5, 6.

The shell is oblong with subparallel dorsal and ventral borders, twice as long as wide, the diameter contained about three times in the length. The anterior border is rounded, posterior border truncate below, sloping and more or less convex from the truncation to the posterior end of the hinge. In some specimens the posterior truncation is indistinct, or that extremity may be rounded. The beaks are low and situated near the anterior fourth of the shell's length. Adult shells are blackish, but by transmitted light numerous green rays may be seen, fading out towards the lower border; and when unworn the beaks shows a pretty pattern of distinct green rays on a pinkish or creamy ground. The surface has but little gloss; the cuticle is roughened by growth-lines, which near the edge and on the posterior slope often form cuticular laminæ; the middle part of the valves is smoother, but marked with one or more *small patches of short corrugations*, at right angles to the growth-lines, and near the beaks there are some acute fine radial wrinkles on the posterior-dorsal slope.

The beaks are sculptured with two radial series of short concentric wrinkles separated by a slight depression. The valves are rather thick in the anterior half, becoming abruptly thinner posteriorly. The nacre is purple, fading in the cavity, or bluish white, becoming purplish and iridescent posteriorly. The pseudocardinal teeth are stout, the anterior one in the left valve wedge-shaped, a rather broad rugose heel below it, the posterior one lying directly under the beak; lateral teeth double as usual. The right valve has a stout, rugose pseudocardinal with a fossa and then a very small, compressed laminar tooth above it; lateral tooth single.

Length 73, alt. 37, diam. 23 mm.

Valles River, "near a small falls about three miles below Valles, in the muddy banks of a pool caused by low water. Feb. 4, 1909." (A.A.H.) A few smaller specimens were taken in the Moctezuma River, Casas Viejas River and Tampamolon Creek. A young shell with the corrugation unusually well developed is figured, pl. XXVI, figs. 5, 6.

Lampsilis undivaga n. sp. Pl. XXVI, figs. 1, 2, 3, 4.

The shell is oblong, the altitude about three-fifths of the length, diameter slightly over one-third the length; solid, dull blackish brown, without rays. The anterior end is rounded, posterior end more or less truncate below, sloping steeply above. Surface of the valves with sculpture of distinct growth-lines, and sometimes having a patch of very indistinct vertical corrugations near the posterior ridge on the most convex portion. There is also some fine oblique corrugation on the posterior-dorsal slope near the beaks, when not worn off. Beaks low, between the anterior fifth and sixth of the length; when perfect the tip is acute and sculptured with a series of short folds on the posterior ridge. The interior is fleshy-purplish, iridescent posteriorly; nacre in the anterior half is *very thick,* posteriorly thin. Cavity of the beaks deep and angular. The pseudocardinal teeth are stout, otherwise formed as in *L. signata*; laterals curved.

Length 54, alt. 33, diam. 19 mm.
“ 54, “ 30, “ 18 “
“ 50, “ 30, “ 18 “

Valles River two miles above Mecos, in a muddy bank just above rapids.

This species is closely related to *L. signata,* but the valves are thicker and heavier, the teeth are heavier, and the proportions differ. It is apparently related to *L. aztecorum* (Phil.),[1] but that is described as thin, “*valvulis satis tenuibus,*” whereas in *L. undivaga* the valves are quite heavy and strong for a *Lampsilis* of this size.

The nacre is nearly white in a few examples. It abruptly becomes thick in the posterior half of the shell. Young shells are conspicuously rayed with green.

One young shell from the Valles River at Valles (pl. XXVII, fig. 5), seems to belong to this species, though I am not quite sure of the identity. It is 41 mm. long, yellowish, nearly covered with green rays, the nacre is pale purple, with a wide darker purple margin posteriorly.

Lampsilis novileonis n. sp. Pl. XXVII, figs. 1, 2.

The shell is oblong, rather compressed, the upper and basal margins slightly and about equally arcuate, anterior end rounded, posterior end sloping above, truncate and somewhat biangular below, beaks at the anterior two-sevenths of the length. The surface is convex, without angle or ridge bounding the posterior slope, not very glossy, smoothish for the greater part, but on the posterior slope there is some oblique corrugation in the upper part of the disk. The epidermis is yellow, sparsely marked in the posterior half with narrow green rays. The very low beaks are eroded in the type specimen. The interior is white, thicker anteriorly, very gradually becoming thinner at the posterior end, where opalescent tints are beautifully produced. The cavity of the beak is rather deep. The lateral teeth are short and rather widely separated from the stout cardinals, which are double and about equally prominent in the left valve.

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[1] *Unio aztecorum* Philippi, *Abbildungen und Beschreibungen neuer oder wenig bekannter Conchylien,* III, pl. 6, fig. 2.

Length 78, alt. 43.5, diam. 22.5 mm.

Casas Viejas River, State of San Luis Potosi.

With some resemblance to *L. moctezumensis*, this species differs by the slight corrugation of the posterior slope and the more compressed form. Some young specimens (pl. XXVII, fig. 7) from the type locality, which seem referable to this species, have the whole valves ornamented with wide green rays. The beaks have a minute area sculptured with about four concentric wrinkles, which are very weakly bilobed. Outside of this sculptured portion the green rays are very distinct, as in allied species. A faint rib or green stripe radiates from the beak in the middle of the posterior slope, which is in part obliquely corrugated. These specimens measure from 17½ to 36 mm. long.

Lampsilis coyensis n. sp. Pl. XXVII, figs. 3, 4.

The shell is oblong, with beaks at the anterior fourth of its length; slightly wider posteriorly, the posterior end sloping above, biangular below; anterior end rounded; basal outline moderately curved, convex. There is a rather distinct angulation from the beak towards the posterior-basal angle, and the indistinct trace of a ridge to the posterior-median angle. The beaks are low, with minute, recurved tips sculptured with a few coarse double-festooned wrinkles, the connection between the two curves almost interrupted. The sculptured portion is not quite two mm. long. Subsequent growth is marked with growth-lines only, or with a very slight oblique corrugation in places on the posterior slope. The epidermis is rather smooth but not glossy, and is shortly and finely lamellose towards the margins. Color obscure greenish yellow, indistinctly marked all over with green rays. Near the beaks the rays are very distinct on a light ground. By transmitted light it is light yellowish, very profusely marked with green rays. The interior is white and somewhat thick anteriorly, thin, blue and slightly iridescent in the posterior half. The teeth are moderately strong.

Length 36, alt. 21, diam. 13.5 mm.

Coy River, State of San Luis Potosi, Mexico, collected by Mr. A. A. Hinkley, January, 1909.

These Lampsilis from the Coy River were found where there was a long mosslike plant growing, the current of the stream keeping it in a constant waving motion. The water was two to four feet deep. The Lampsilis were found by feeling in the roots of this moss.

On the moss and bed of the stream were *Pachycheilus* and *Lithasiopsis*, but the former were more numerous lower down the stream in a small recess where there was no current. In this recess were also found the small species taken in this stream. They were in the sediment, and on water plants and near the water's edge. The stream is clear, deep and with a strong current.

This may turn out to be a small, rayed variety of *L. novileonis,* yet specimens from 28 to 36 mm. long have every appearance of adult shells. The cardinal teeth in the left valve are stouter and their crests are more united than in *L. novileonis.*

While *L. undivaga, coyensis* and *novileonis* are closely related species, they seem, with present material, to be distinct.

Lampsilis metallica ganina n. subsp. Pl. XXVII, fig. 6.

The shell resembles *L. metallica* (Say) (*Unio cuprinus* Lea) in general appearance, but is constantly smaller, more compressed and more reniform. Near the beaks there are green rays on a pale ground, the rest of the valve being brownish black.

Length 47, alt. 25, diam. 13½ mm.
“ 47½, “ 26½, “ 16 “
“ 39, “ 21, “ 13 “

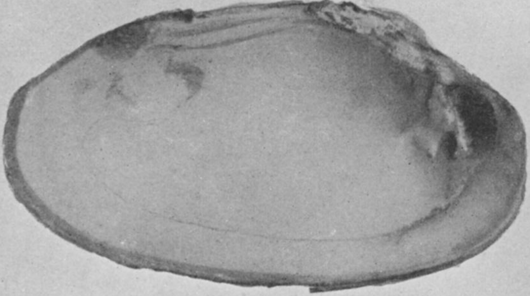
Ganina River, three miles southwest of San Dieguito. The specimens are heavily incrusted with calcareous matter posteriorly, but are free from erosion.

Glabaris strebeli (Lea). Pl. XXVII, fig. 8.

Anodonta strebeli Lea, Obs., XII, p. 82, pl. 52, fig. 135 (Vera Cruz).

Tampamolon Creek, two specimens. Casas Viejas River, one young shell.

The epidermis is very glossy anteriorly, but dull and shortly lamellose on the posterior half. In the median part there are several rays composed of short threads in the direction of growth-lines, but caught up and interrupted in the middle, as though scored upward when soft. These peculiar markings occur on some other species of *Glabaris,* and are constant in all the specimens of *G. strebeli* I have seen from Vera Cruz and San Luis Potosi. The anterior end of the shell has a sculpture of threads along the lines of growth. The sinulus, or glossy area at the posterior end of the hinge-line, is triangular, pointed below, as in *Glabaris,* not shallow, as in *Anodonta;* so that Mr. Simpson's reference of the species to *Glabaris* is justified. It ranges north farther than any other species of the genus. *G. cylindraceus* (Lea), from the Medellin River, is evidently an allied form.



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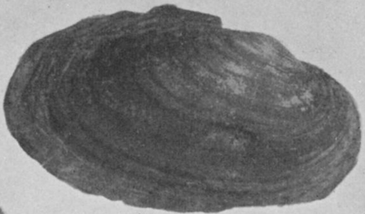

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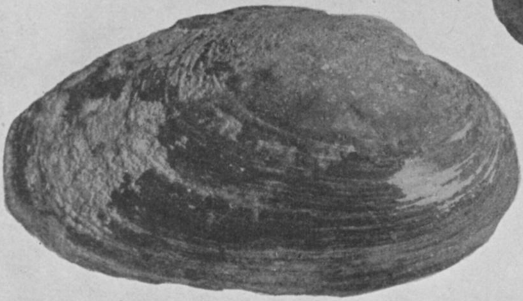

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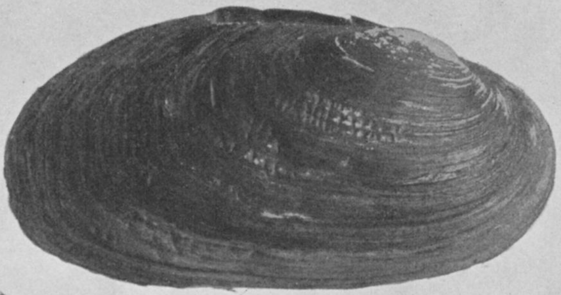

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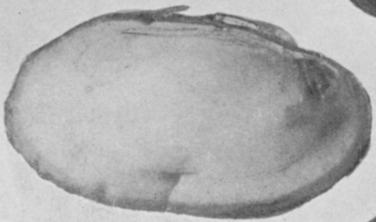

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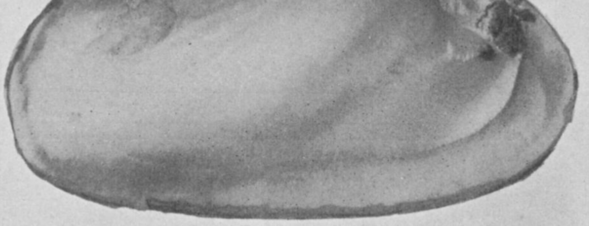

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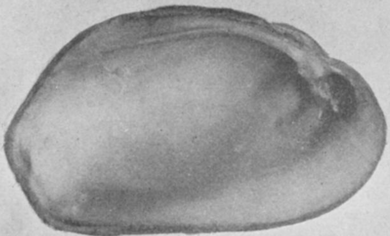
PILSBRY: UNIONIDÆ OF THE PANUCO RIVER, MEXICO.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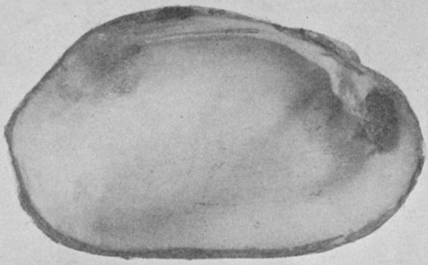
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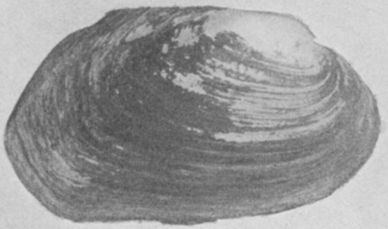
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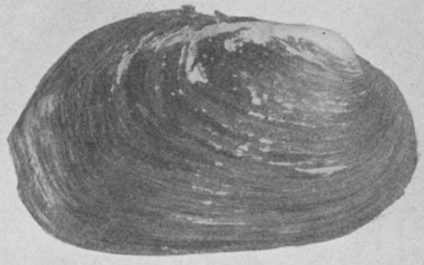
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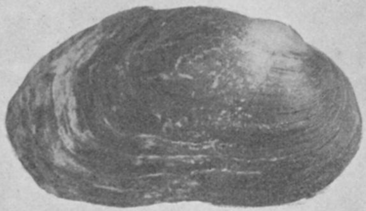
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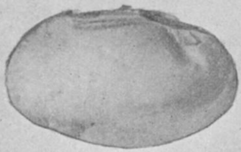
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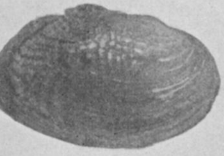
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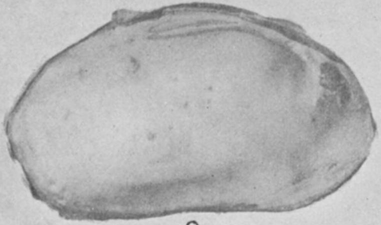
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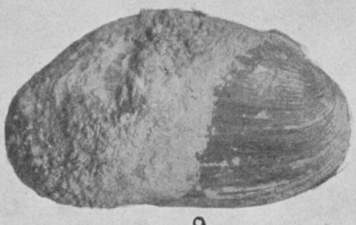
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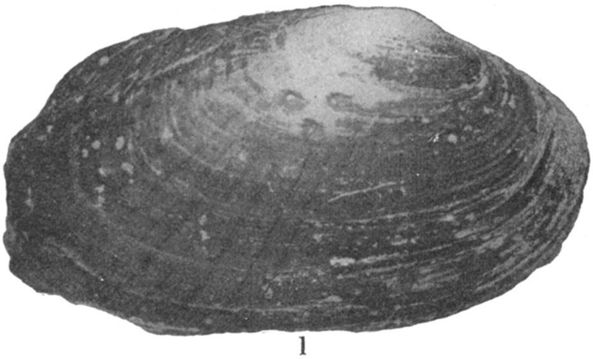
PILSBRY: UNIONIDÆ OF THE PANUCO RIVER MEXICO.



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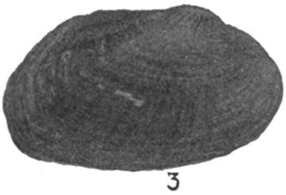

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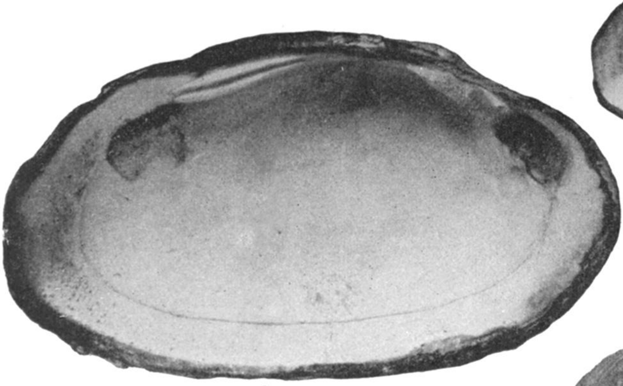

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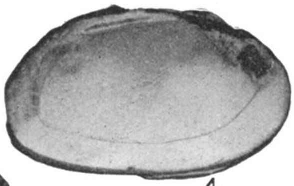

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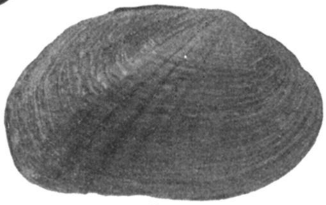

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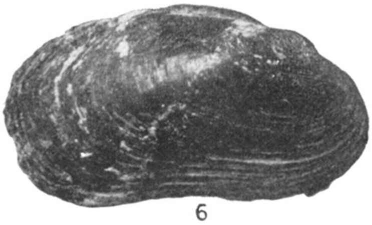

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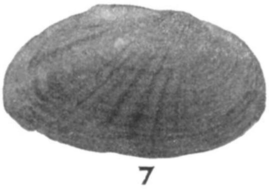

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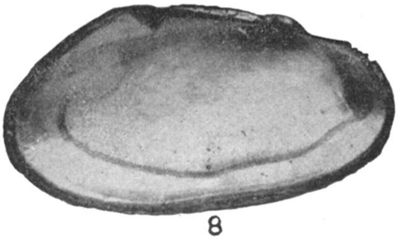

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PILSBRY: UNIONIDÆ OF THE PANUCO RIVER, MEXICO.